

DEPARTMENT OF ECONOMICS
COLORADO STATE UNIVERSITY

AREC 741 and ECON 741: Advanced Environmental Economics

Spring 2018, TR 12:30 PM – 13:45 PM, 118 Eddy

Professor Edward B. Barbier

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Office Hours

TR 10:00 AM – 11:30 AM, or by appointment

Course Website (2018SP-AREC-741-001)

Available at <http://canvas.colostate.edu>

Make sure that your email is set to receive announcements from this system. In the uncommon circumstances that I have to cancel regular class or office hours, I will announce this through the course website. University weather closures are announced via the University alert system.

Course Description: This course explores recent theoretical and empirical advances in natural resource and environmental economics. The lectures and seminars will be organized around the following key topics: land use and soil erosion, forestry for timber and non-timber benefits, valuing non-market ecological functions, trade and resource use, resource management under uncertainty, and sustainable development.

Prerequisites

It is presumed that students taking the course have completed graduate-level micro and macro course sequence in economics, or equivalent.

Learning Objectives

The main aim of this course is to encourage graduate students to become familiar with recent advances in theoretical and empirical analyses of environmental and resource economics through learning to read, critically evaluate, and hopefully begin developing, analytical contributions to these areas. The first part of the course will involve the instructor introducing the students to the topics through selecting key articles and readings to critically evaluate. This will take place through both lectures and group discussion. The final part of the course will involve student-led seminars based on the course topics. Each seminar will consist of both a paper presentation as well as a group discussion of the material presented.

Grading and Course Requirements

The academic requirements of this course consist of a final examination at the end of the semester and two seminar papers and presentations. **The exam will count for 40% of your**

final grade, and each seminar paper and presentation will count for 30% (20% for the paper and 10% for the presentation). All grading will be done on a standard point system and not curved.

The final examination will be based on the required reading indicated under each topic, and in particular the material introduced in class during the first part of the course.

For the first seminar presentation and paper, each student will have to choose a published paper relevant to any one of the course topics, explain the methodology and results, critically evaluate the modelling approach of the paper, and finally, suggest briefly a possible extension or reformulation of the model. For the second seminar presentation and paper, the student will attempt to develop further the suggested extension or reformulation of the model into his or own paper on the selected topic, and explain the possible contribution of this approach to the literature.

The distribution of seminar topics among students will be agreed by **February 1**. Although not all topics need to be covered, a broad spectrum of seminar topics will be the aim.

On the day of the student's first seminar the student should hand out to the class a version of the first paper. However, the deadline for all students to submit a final version of the first seminar paper is **April 5**. The student should also be prepared to hand out a version of their second paper on the day of that seminar. However, the deadline for all students to submit a final version of the second seminar paper is **May 1**.

The final examination is scheduled to be held on **Wednesday May 9 from 9:40 AM to 11:40 AM** (See <http://registrar.colostate.edu/academic-resources/final-exams/>).

Contact Hours and Expectations for Work Outside of Instructional Time

To be successful, each week students are expected to spend approximately three hours in lecture, and at least six hours engaging in activities including reading the texts and journal references, reviewing class notes, and researching and preparing the two seminar assignments. Preparation for the final exam will involve additional review and studying of course material at the end of the semester.

Policy on Course Attendance

You are expected to be present in class and are responsible for the material covered whether or not it is also posted online. If you miss class, it is your responsibility to inform me in advance, or in case of an emergency, as soon as possible afterwards. You are also expected to find out from your classmates what you have missed and obtain relevant notes and any in-class materials from them. As per University policy, students are exempted from attending class for University sanctioned activities with appropriate official documentation. In general, with evidence of sanctioned activity, you may be able to arrange to turn in materials early.

Other Course Policies

Disruptive behavior is not tolerated and is grounds for being asked to leave. This includes the use of cell phones, reading newspapers, and accessing any other unrelated material in class.

Offensive or threatening treatment of an individual is especially not tolerated. Disruptive students will be referred to University officials. In general, I will expect that you be respectful of me and your classmates, and that you will take the course seriously.

Departmental Statement on Copyright

Please do not share material from this course in online, print or other media. Course material is the property of the instructor who developed the course. Materials authored by third parties and used in this course are also subject to copyright protection. Posting course materials on external online sites (commercial or not) violates both copyright law and the CSU Student Contact Code. Students who share course content without the instructor's express permission, including with online sites that post materials so sell to other students, could face disciplinary or legal action. This includes seminar papers and presentation, or any final exam questions and answers.

Academic Integrity

This course will adhere to the CSU Academic Integrity Policy as found on the Student Responsibilities page of the CSU General Catalog and in the Student Conduct Code. At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

As per University policy, "Any student found responsible for having engaged in academic misconduct will be subject to academic penalty and and/or University disciplinary action" (General Catalog, <http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/>). As such, any academic dishonesty in this course may result in a grade of "F" for the course and may be reported to the Office of Conflict Resolution and Student Conduct Services. Please be aware that the General Catalog specifically identifies the following examples of academic dishonesty: cheating, plagiarism, unauthorized possession or disposition of academic materials, falsification, and facilitation of cases of academic dishonesty. Plagiarism is defined as follows: "Plagiarism includes the copying of language, structure, images, ideas, or thoughts of another, and representing them as one's own without proper acknowledgement and is related only to work submitted for credit; the failure to cite sources properly; sources must always be appropriately referenced, whether the source is printed, electronic or spoken. Examples include a submission of purchased research papers or homework as one's own work; paraphrasing and/or quoting material without properly documenting the source" (General Catalog, <http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/>).

Accommodations

Students requesting special accommodations should contact Resources for Disabled Students (RDS) at 970-491-6385. Accommodations for exams will not be granted without pre-approval from RDS. If this applies to you, please make arrangements immediately.

Title IX

CSU's Discrimination, Harassment, Sexual Harassment, Sexual Misconduct, Domestic Violence, Dating Violence, Stalking, and Retaliation Policy designates faculty and employees of the University as "Responsible Employees". This designation is consistent with federal law and guidance, and requires faculty to report information regarding students who may have experienced any form of sexual harassment, sexual misconduct, relationship violence, stalking or

retaliation. This includes information shared with faculty in person, electronic communications or in class assignments. A “Responsible Employees”, faculty may refer students to campus resources (see below), together with informing the Office of Support and Safety Assessment to help ensure student safety and welfare. Information regarding sexual harassment, sexual misconduct, relationship violence, stalking or retaliation is treated with greatest degree of confidentiality possible while also ensuring student and campus safety.

Any student who may be the victim of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation is encouraged to report to CSU through one or more of the following resources: Emergency Response 911, Deputy Title IX Coordinator/Office of Support and Safety Assessment 970-491-1350, CSU Police Department (non-emergency) 970-491-6425. For counseling support and assistance, please see the CSU Health Network, which includes a variety of counseling services that can be accessed at <http://www.health.colostate.edu/>. The Sexual Assault Victim Assistance Team is a confidential student resource that does not have a reporting requirement: <http://www.wgac.colostate.edu/need-help-support/>.

Course Readings

The course is organized around a set of key topics in environmental and resource economics. There is no required text for this course. Instead, each topic will contain a number of core readings selected from key journal articles and book chapters, which students are expected to read.

Although there is no required text for the course, the following three texts are recommended:

van Kooten, G. and H. Folmer. 2004. *Land and Forest Economics*. Edward Elgar, Cheltenham, UK.

Conrad, J.M. 2010. *Resource Economics*, 2nd ed. Cambridge University Press, New York.

Barbier, E.B. 2011. *Capitalizing on Nature: Ecosystems as Natural Assets*. Cambridge University Press, New York.

Students should obtain copies of these texts, especially if they plan to pursue further graduate studies in environmental and natural resource economics.

Course Outline

The following topics form the basis of the course. Under each topic is a list of **core readings** that each student is required to read. The lectures and group discussions in the first part of this course will be drawn from these readings. Students should have read these course readings in advance and be prepared to discuss them in class.

The **suggested readings** under each topic indicate the type of papers that each student might select for the first seminar paper and presentation. The student does not have to choose one of these papers, but is encouraged to pick a paper that is related to this literature. Any paper chosen for a student's seminar that is not on this list needs to be approved in advance by the instructor.

0. Natural Resource Applications of Dynamic Optimization

Core readings:

Chapters 1-2 in J.M. Conrad. 2010. *Resource Economics*, 2nd ed. Cambridge University Press, New York.

Chapter 1 in Conrad, J.M. and C.W. Clark. 1987. *Natural Resource Economics: Notes and Problems*. Cambridge University Press, New York.

I Land and Water

Core Readings:

Chapters 3 and 9 in van Kooten, G. and H. Folmer. 2004. *Land and Forest Economics*. Edward Elgar, Cheltenham, UK.

Chapters 1-2 in Barbier, E.B. 2011. *Capitalizing on Nature: Ecosystems as Natural Assets*. Cambridge University Press, New York.

McConnell, K.E. 1983. "An Economic Model of Soil Conservation." *American Journal of Agricultural Economics* 65(1):83-89.

Barbier, E.B. 1990. "The Farm-Level Economics of Soil Conservation: The Uplands of Java." *Land Economics* 66(2):199-211.

Suggested Readings:

Abdulai, A., V. Owusu and R. Goetz. 2011. "Land Tenure Differences and Investment in Land Improvement: Theoretical and Empirical Analyses." *Journal of Development Economics* 96:66-78.

Albers, H.J., M.J. Goldbach and D.T. Kaffine. 2006. "Implications of Agricultural Policy for Species Invasion in Shifting Cultivation Systems." *Environment and Development Economics* 11:429-452.

- Barbier, E.B. and A.M. Chaudhry. 2014. "Urban growth and water." *Water Resources and Economics* 6:1-17.
- Barbier, E.B., R.E. López and J.P. Hochard. 2016. "Debt, Poverty and Resource Management in a Rural Smallholder Economy." *Environmental and Resource Economics* 63:411-427.
- Bekele, W. 2005. "Stochastic Dominance Analysis of Soil and Water Conservation in Subsistence Crop Production in the Eastern Ethiopian Highlands: The Case of the Hunde-Lafto Area." *Environmental and Resource Economics* 32(4):533-550.
- Besley, T. 1995. "Property Rights and Investment Incentives." *Journal of Political Economy* 103(5):903-937.
- Carter, M.R. and P. Olinto. 2003. "Getting Institutions 'Right' for Whom? Credit Constraints and the Impacts of Property Rights on the Quantity and Composition of Investment." *American Journal of Agricultural Economics* 85(1):173-186.
- Chaudhry, A.M. and E.B. Barbier. 2013. "Water and Growth in an Agricultural Economy." *Agricultural Economics*. 44:175-189.
- Chen, C. 2017. "Untitled Land, Occupational Choice, and Agricultural Productivity." *American Economic Journal: Macroeconomics* 9(4):91-121.
- Coxhead, I. G. Shively and X. Shau. 2002. "Development Policies, Resource Constraints, and Agricultural Expansion on the Philippine Land Frontier." *Environment and Development Economics* 7(2):341-364.
- De Pinto, A. and G.C. Nelson. 2009. "Land Use Change with Spatially Explicit Data: A Dynamic Approach." *Environmental and Resource Economics* 43(2):209-229.
- Di Corato, L., Moretto, M. and Vergalli, S., 2013. "Land conversion pace under uncertainty and irreversibility: too fast or too slow?" *Journal of Economics*, 110(1):45-82.
- Esteban, E. and A. Dinar. 2016. "The Role of Groundwater-Dependent Ecosystems in Groundwater Management." *Natural Resource Modeling* 29:98-129.
- Giannakas, K. and J.D. Kaplan. 2005. "Policy Design and Conservation Compliance on Highly Erodible Lands." *Land Economics* 81:20-33.
- Gollin, D. and R. Rogerson. 2014. "Productivity, transport costs and subsistence agriculture." *Journal of Development Economics* 107:38-48.
- Grossman, H.I. 1994. "Production, Appropriation and Land Reform." *American Economic Review* 84(3):705-712.

Guiling, P., B.W. Brorsen and D. Doye. 2009. "Effect of Urban Proximity on Agricultural Land Values." *Land Economics* 85(2):252-264.

Hansen, L. and D. Hellerstein. 2007. "The Value of the Reservoir Services Gained with Soil Conservation." *Land Economics* 83:285-301.

Horowitz, J.K. and R.E. Just. 2013. "Economics of additionality for environmental services from agriculture." *Journal of Environmental Economics and Management* 66:105-122.

Hotte, L. 2001. "Conflicts over property rights and natural resource exploitation at the frontier." *Journal of Development Economics* 66:1-21.

Innes, R. 2003. "Stop and Go Policies with a Land Market." *American Journal of Agricultural Economics* 85(1):198-215.

Kaminiski, J. and A. Thomas. 2011. "Land Use, Production Growth, and the Institutional Environment of Smallholders: Evidence from Burkina Faso Cotton Farmers." *Land Economics* 87:161-182.

Louhichi, K., G. Flichman and J.M. Boisson. 2012. "Bioeconomic Modeling of Soil Erosion Externalities and Policy Options: a Tunisian Case Study." *Journal of Bioeconomics* 12:145-167.

Mounford, A. 2004. "Global Analysis of an Overlapping Generations Economy with Land." *Macroeconomic Dynamics* 8:582-595.

Nakhumwa, T.O. and R.M. Hassan. 2012. "Optimal Management of Soil Quality Stocks and Long-Term Consequences of Land Degradation for Smallholder Farmers in Malawi." *Environmental and Resource Economics* 52:415-433.

Pascual, U. and E.B. Barbier. 2006. "Deprived Land-Use Intensification in Shifting Cultivation: The Population Pressure Hypothesis Revisited." *Agricultural Economics* 34:155-165.

Pascual, U. and E.B. Barbier. 2007. "On Price Liberalization, Poverty and Shifting Cultivation: An Example from Mexico." *Land Economics* 83(2):192-216.

Ram, R. and S. Athalye. 2009. "Drought Resilience in Agriculture: The Role of Technological Options, Land Use Dynamics and Risk Perception." *Natural Resource Modeling* 22(3):437-462.

Robalino, J.A. 2007. "Land Conservation Policies and Income Distribution: Who Bears the Burden of Our Environmental Efforts?" *Environment and Development Economics* 12(4):521-534.

Takasaki, Y. 2007. "Dynamic Household Models of Forest Clearing under Distinct Land and Labor Market Institutions: Can Agricultural Policies Reduce Tropical Deforestation?" *Environment and Development Economics* 12(3):423-444.

Vyn, R.J. 2012. "Examining for Evidence of the Leapfrog Effect in the Context of Strict Agricultural Zoning." *Land Economics* 88:457-477.

Wu, J. and E.G. Irwin. 2008. "Optimal Land Development with Endogenous Environmental Amenities." *American Journal of Agricultural Economics* 90:232-248.

II Forestry for Timber and Non-Timber Benefits

Core Readings:

Chapters 11-13 in van Kooten, G. and H. Folmer. 2004. *Land and Forest Economics*. Edward Elgar, Cheltenham, UK.

Chapter 4 in J.M. Conrad. 2010. *Resource Economics*, 2nd ed. Cambridge University Press, New York.

Samuelson, P.A. 1976. "Economics of Forestry in an Evolving Society." *Economic Inquiry* 14:466-492.

Hartman, R. 1976. "The Harvesting Decision When the Standing Forest Has Value." *Economic Inquiry* 14:52-58.

Suggested Readings:

Akpalu, W. and P.J. Parks. 2007. "Natural Resource Use Conflict: Gold Mining in Tropical Rainforest in Ghana." *Environment and Development Economics* 12(1):55-72.

Alaouze, C.M. 2004. "The Effect of Conservation Value on the Optimal Forest Rotation." *Land Economics* 80(2):209-223.

Alix-Garcia, J. 2007. "A spatial analysis of common property deforestation," *Journal of Environmental Economics and Management* 53:141-157.

Alix-Garcia, J. 2008. "An exploration of the positive effect of inequality on common property forests." *Journal of Development Economics* 87:92-105.

Alix-Garcia, J.M., E.N. Shapiro and K.R.E. Sims. 2012. "Forest Conservation and Slippage: Evidence from Mexico's National Payments for Ecosystem Services Program." *Land Economics* 88:613-638.

Amacher, G.S., E. Koskela and M. Ollikainen. 2002. "Optimal Forest Policies in an Overlapping Generations Economy with Timber and Money Bequests." *Journal of Environmental Economics and Management* 44(2):346-369.

Amacher, G.S., E. Koskela and M. Ollikainen. 2009. "Deforestation and Land Use under Insecure Property Rights." *Environment and Development Economics* 14(3):281-304.

- Amacher, G.S. M. Ollikainen and E. Koskela. 2012. "Corruption and forest concessions." *Journal of Environmental Economics and Management* 63:92-104.
- Barbier, E.B. and A. Tesfaw. 2013. "Tenure Constraints and Carbon Forestry in Africa." *American Journal of Agricultural Economics* 95: 964-975.
- Barbier, E.B. and A. Tesfaw. 2015. "Explaining Forest Transitions: The Role of Governance." *Ecological Economics* 119:252–261
- Barua, S.K., J. Lintunen, J. Uusivuori and J. Kuuluvainen. 2014. "On the economics of tropical deforestation: Carbon credit markets and national policies." *Forest Policy and Economics* 47:36-45.
- Boscolo, M. and J.R. Vincent. 2003. "Nonconvexities in the Production of Timber, Biodiversity and Carbon Sequestration." *Journal of Environmental Economics and Management* 46:251-268.
- Boscolo, M. and J.R. Vincent. 2007. "Area Fees and Logging in Tropical Timber Concessions." *Environment and Development Economics* 12(4):505-520.
- Burgess, R., M. Hansen, B.A. Olken, P. Potapov and S. Sieber. 2012. "The Political Economy of Deforestation in the Tropics." *Quarterly Journal of Economics* 127(4):1707-1754.
- Busby, G.M., H.J. Albers and C.A. Montgomery. 2012. "Wildfire Risk Management in a Landscape with Fragmented Ownership and Spatial Interactions." *Land Economics* 88:496-517.
- Conrad, R.F., M. Gillis and E. Mercer. 2005. "Tropical Forest Harvesting and Taxation: A Dynamic Model of Harvesting Behavior under Selective Extraction Systems." *Environment and Development Economics* 10(5):689-709.
- Crépin, A-S. 2003. "Multi-Species Boreal Forests – What Faustmann Missed." *Environmental and Resource Economics* 26(4):625-646.
- Delacote, P. 2009. "Commons as Insurance: Safety Nets or Poverty Traps?" *Environment and Development Economics* 14:305-322.
- Eerola, E. 2004. "Forest Conservation – Too Much or Too Little? A Political Economy Model." *Environmental and Resource Economics* 27:391-407.
- Engel, S. and R. López. 2008. "Exploiting common resources with capital-intensive technologies: the role of external forces." *Environment and Development Economics* 13:565-589.
- Engel, S., R. López and C. Palmer. 2006. "Community-Industry Contracting over Natural Resource Use in a Context of Weak Property Rights: The Case of Indonesia." *Environmental and Resource Economics* 33:73-93.

- Goeschl, T. and D.C. Iglori. 2004. "Reconciling Conservation and Development: A Dynamic Hotelling Model of Extractive Reserves." *Land Economics* 80:340-354.
- Kuusela, O.-P. and G. Amacher. 2016. "Changing Political Regimes and Tropical Deforestation." *Environmental and Resource Economics* 64:445-463.
- Liscow, D. 2013. Do Property Rights Promote Investment But Cause Deforestation? Quasi-Experimental Evidence from Nicaragua." *Journal of Environmental Economics and Management* 65:241-261.
- López-Feldman, A. and J.E. Wilen. 2008. "Poverty and Spatial Dimensions of Non-Timber Forest Extraction." *Environment and Development Economics* 13(5):621-642.
- Mason, C.F. and A.J. Platinga. 2013. "The Additionality Problem with Offsets: Optimal Contracts for Carbon Sequestration in Forests." *Journal of Environmental Economics and Management* 66:1-14.
- Mullan, K., E. Sills, S.K. Pattanayak and J. Caviglia-Harris. 2017. "Converting Forests to Farms: The Economic Benefits of Clearing Forests in Agricultural Settlements." *Environmental and Resource Economics* (published online), 1-29.
- Nalle, D.J., C.A. Montgomery, J.L. Arthus, S. Polasky and N.H. Schumaker. 2004. "Modeling Joint Production of Wildlife and Timber." *Journal of Environmental Economics and Management* 48:997-1017.
- Ollivier, H. 2012. "Growth, Deforestation and the Efficiency of the REDD Mechanism." *Journal of Environmental Economics and Management* 64:312-327.
- Robinson, E.J.Z., H.J. Albers and J.C. Williams. 2011. "Sizing Reserves within a Landscape: The Roles of Villagers' Reactions and the Ecological-Socioeconomic Setting." *Land Economics* 87:233-249.
- Salo, S. and O. Tahvonen. 2003. "On the Economics of Forest Vintages." *Journal of Economic Dynamics and Control* 27(8):1411-1435.
- Satake A. and T.K. Rudel. 2007. Modelling the forest transition: forest scarcity and ecosystem service hypotheses. *Ecological Applications* 17:2024-2036.
- Sims, C., D. Aadland and D. Finnoff. 2010. "A Dynamic Bioeconomic Analysis of Mountain Pine Beetle Epidemics." *Journal of Economic Dynamics & Control* 34:2407-2419.
- Sims, C., D. Aadland, D. Finnoff and J. Powell. 2013. "How Ecosystem Service Provision Can Increase Forest Mortality from Insect Outbreaks." *Land Economics* 89:154-176.
- Sirén, A.H., J-C. Cardenas, P. Hambäck and K. Parvinen. 2013. "Distance Friction and the Cost of Hunting in Tropical Forest." *Land Economics* 89:558-574.

Sohngen, B. and R. Mendelsohn. 2003. "An Optimal Control Model of Forest Carbon Sequestration." *American Journal of Agricultural Economics* 85:448-457.

Strand, J. 2017. "Modeling the marginal value of rainforest losses: A dynamic value function approach." *Ecological Economics* 131:323-329.

Termansen, M. 2007. "Economies of Scale and the Optimality of Rotational Dynamics in Forestry." *Environmental and Resource Economics* 37(4): 643-659.

Touza, J., M. Termansen and C. Perrings. 2008. "A Bioeconomic Approach to the Faustmann-Hartman Model: Ecological Interactions in Managed Forest." *Natural Resource Modeling* 21(4):551-581.

III Ecosystems as Natural Assets

Core Readings:

Chapter 3 in J.M. Conrad. 2010. *Resource Economics*, 2nd ed. Cambridge University Press, New York.

Chapters 3-4 in Barbier, E.B. 2011. *Capitalizing on Nature: Ecosystems as Natural Assets*. Cambridge University Press, New York.

Barbier, E.B. 2007. "Valuing Ecosystem Services as Productive Inputs" *Economic Policy* 22 (49): 177-229.

Suggested Readings:

Alix-Garcia, J., A. De Janvry and E. Sadoulet. 2008. "The Role of Deforestation, Risk and Calibrated Compensation in Designing Payments for Environmental Services." *Environment and Development Economics* 13:375-394.

Alix-Garcia, J.M., E.N. Shapiro and K. Sims. 2012. "Forest Conservation and Slippage: Evidence from Mexico's National Payments for Ecosystem Services Program." *Land Economics* 88:613-638.

Barbier, E.B. 2007. "Land Conversion, Interspecific Competition and Bioinvasion in a Tropical Ecosystem." *Journal of Agricultural & Applied Economics* 39(October):133-147.

Barbier, E.B. 2012. "A Spatial Model of Coastal Ecosystem Services." *Ecological Economics* 78:70-79.

Barbier, E.B. and K.D. Lee. 2013. "Economics of the Marine Seascape." *International Review of Environmental and Resource Economics* 7:35-65.

- Batabyal, A.A., J.R. Kahn and R.V. O'Neill. 2003. "On the Scarcity Value of Ecosystem Services." *Journal of Environmental Economics and Management* 46(2):334-352.
- Carson, R.T., C.W.J. Granger, J.B.C. Jackson and W. Schlenker. 2009. "Fisheries Management under Cyclical Growth Dynamics." *Environmental and Resource Economics* 42:379-410.
- Champetier, A., D.A. Sumner and J.E. Wilen. 2015. "The Bioeconomics of Honey Bees and Pollination." *Environmental and Resource Economics* 60:143-164.
- Chen, Y., C. Jayaprakash and E. Irwin. 2012. "Threshold Management in a Coupled Economic-Ecological System." *Journal of Environmental Economics and Management* 64:442-455.
- Eichner, T. and R. Pethig. 2006. "Economic Land Use, Ecosystem Services and Microfounded Species Dynamics." *Journal of Environmental Economics and Management* 52(3):707-720.
- Eiswerth, M.E. and W.S. Johnson. 2003. "Managing Nonindigenous Invasive Species: Insights from Dynamic Analysis." *Environmental and Resource Economics* 23:319-342.
- Fenichel, E.P. and J.K. Abbott. 2014. "Natural Capital: From Metaphor to Measurement." *Journal of the Association of Environmental and Resource Economists*. 1:1-27.
- Ferraro, P. and D. Simpson. 2002. "The Cost-Effectiveness of Conservation Performance Payments." *Land Economics* 78:339-353.
- Finnoff, D., A. Strong and J. Tschirhart. 2008. "A Bioeconomic Model of Cattle Stocking on Rangeland Threatened by Invasive Plants and Nitrogen Disposition." *American Journal of Agricultural Economics*. 90:1074-1090.
- Finnoff, D. and J. Tschirhart. 2003. "Protecting a Species While Harvesting its Prey in a General Equilibrium Ecosystem Model." *Land Economics* 79(2):160-180.
- Fischer, C., E. Muchapondwa and T. Sterner. 2011. "A Bio-Economic Model of Community Incentives for Wildlife Management Under CAMPFIRE." *Environmental and Resource Economics* 48:303-319.
- Groom, B. and C. Palmer. 2010. "Cost-Effective Provision of Environmental Services: The Role of Relaxing Market Conditions." *Environment and Development Economics* 15:219-240.
- Horan, R.D., J.F. Shogren and B.M. Gramig. 2008. "Wildlife Conservation Payments to Address Habitat Fragmentation and Disease Risks." *Environment and Development Economics* 13(3):415-439.
- Horan, R.D., C.A. Wolf, E.P. Fenichel and K.H. Matthews. 2008. "Joint Management of Wildlife and Livestock Disease." *Environmental and Resource Economics* 41:47-70.

- Kennedy, C.J. and E.B. Barbier. 2013. "Renewable Resource Management with Environmental Prediction: The Importance of Structural Specification." *Canadian Journal of Economics* 46(3):1110-1122.
- Kennedy, C.J. and E.B. Barbier. 2015. "Renewable resource harvesting under correlated biological and economic uncertainties: implications for optimal and second-best management." *Environmental and Resource Economics* 60:371-393.
- Kennedy, C.J. and E.B. Barbier. 2016. "The economic value of freshwater inputs to an estuarine fishery." *Water Resources and Economics* 13:46-59
- Knowler, D. and E.B. Barbier. 2005. "Managing the Black Sea Anchovy Fishery with Nutrient Enrichment and a Biological Invader". *Marine Resource Economics* 20(3):263-285.
- Knowler, D. and E.B. Barbier. 2005. "Importing Exotic Plants and the Risk of Invasion: Are Market-Based Instruments Adequate?" *Ecological Economics* 52:341-354.
- Mahmud, S. and E.B. Barbier. 2016. "Are private defensive expenditures against storm damages affected by public programs and natural barriers? Evidence from the coastal areas of Bangladesh." *Environment and Development Economics* 21:767-788.
- Nguyen, T.V., L. Ravn-Jonsen and N. Vestergaard. 2016. "Marginal Damage Cost of Nutrient Enrichment: The Case of the Baltic Sea." *Environmental and Resource Economics* 64:109-129.
- Richter, A., D. van Soest and J. Grasman. 2013. "Contagious Cooperation, Temptation and Ecosystem Collapse." *Journal of Environmental Economics and Management* 66:141-158.
- Rodwell, L.D. E.B. Barbier, C.M. Roberts, and T.R. McClanahan. 2002. "A Model of Tropical Marine Reserve-Fishery Linkages" *Natural Resource Modeling* 15:453-486.
- Roumasset, J. and C.A. Wada. 2011. "Ordering Renewable Resources: Groundwater, Recycling and Desalination." *The B.E. Journal of Economic Analysis & Policy* Vol. 11: Iss.1 (Contributions, Article 28).
- Sanchirico, J.N. 2005. "Additivity Properties in Metapopulation Models: Implications for the Assessment of Marine Reserves." *Journal of Environmental Economics and Management* 49:1-25.
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